

CLAIMS

What is claimed is:

- 5 1. A system for wiping a windshield of a vehicle in a rectangular field, comprising:
- a) a wiper arm assembly;
 - b) a wiper blade assembly operationally attached to said wiper arm assembly; and
 - 10 c) means for rotating and translating said wiper arm assembly to cause said wiper blade assembly to track in a linear path across said windshield.
2. A system in accordance with Claim 1 wherein
- 15 said wiper arm assembly includes a wiper arm having an inner end and an outer end, ~~and wherein~~ said means for rotating and translating comprises:
- a) a track mountable to said vehicle along a direction orthogonal to said linear path;
 - 20 b) a wiper motor having a stator and a rotor, said stator being slidable in said first track, and said rotor being supportive of said wiper arm at said inner end for oscillating motion of said wiper arm assembly about said inner end; and
 - e) ~~means for causing~~ said wiper motor to move along said
 - 25 track during said oscillating motion to cause said outer end of said wiper arm assembly to follow said linear path.

3. A system in accordance with Claim 2 wherein said means for causing said wiper motor to move along said track is selected from the group consisting of:

5 a) a link connected to said wiper arm and pivotable about a fixed pivot point between said track and said linear path; and

b) a linear actuator disposed adjacent said track and connected to said motor for displacing said motor along said track in coordination with said oscillating motion of said wiper arm assembly.

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4. A system in accordance with Claim 2 further comprising:

a) a first tab extending from said motor stator coincident with said wiper arm inner end;

15 b) a second tab extending from said outer end of said wiper arm; and

c) an attitude arm extending between said first and second tabs to form a parallelogram arrangement therewith, said wiper blade assembly being fixed to said second tab.

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5. A system in accordance with Claim 1 wherein said means for rotating and translating comprises:

a) a first horizontal track disposed adjacent an edge of said windshield;

25 b) a second track generally orthogonal to said first track;

c) a car disposed for translation along said first track and supportive of said wiper blade assembly extending over said windshield; and

d) a wiper motor having a stator and a rotor, said stator being slidable in said second track, and said rotor being supportive of said wiper arm at said inner end for oscillating motion of said wiper arm assembly about said inner end, said
5 outer end of said wiper arm being attached to said car.

6. A system in accordance with Claim 5 further comprising an attitude arm extending between said motor stator and said car to form a parallelogram arrangement.

10 7. A system in accordance with Claim 1 wherein said means for rotating and translating comprises:

a) a mounting plate;

15 b) a first wiper arm guide disposed for pivoting about a wiper arm pivot point on said mounting plate and for slidably receiving said wiper arm to pass therethrough;

c) second wiper arm guide means attached to an inner end of said wiper arm;

20 d) third wiper arm guide means formed in said mounting plate for receiving said second wiper arm guide means, said first and second wiper arm guide means being cooperative to slide said wiper arm through said first wiper arm guide and simultaneously to pivot said wiper arm and said first wiper arm guide about said wiper arm pivot point such that an outer end of
25 said wiper arm is drawn in a linear path across said windshield; and

e) means for translating said second wiper arm guide means along said third wiper arm guide means.

8. A system in accordance with Claim 7 wherein

a) said second wiper arm guide means includes a post and roller;

5 b) said third wiper arm guide means includes a slot formed in said mounting plate; and

c) said means for translating includes a motor having a rotor supportive of an actuation arm operatively connected to said second wiper arm guide means.

10 9. A system in accordance with Claim 8 further comprising:

a) an attitude arm having inner and outer ends;

15 b) a first attitude arm guide disposed for pivoting about an attitude arm pivot point on said mounting plate and for slidably receiving said attitude arm to pass therethrough;

c) second attitude arm guide means attached to an inner end of said attitude arm; --

20 d) third attitude arm guide means formed in said mounting plate for receiving said second attitude arm guide means, said first and second attitude arm guide means being cooperative to slide said attitude arm through said first attitude arm guide and simultaneously to pivot said attitude arm and said first attitude arm guide about said attitude arm pivot point;

25 e) a first tab extending between said inner end of said wiper arm and said inner end of said attitude arm;

f) a second tab extending between said outer end of said wiper arm and said outer end of said attitude arm, defining a parallelogram arrangement thereamong; and

e) means for pivotably connecting said first tab to said means for translating.

10. A system in accordance with Claim 9 wherein

5 a) said second attitude arm guide means includes a post and roller; and

b) said third attitude arm guide means includes a slot formed in said mounting plate.

10 11. A system in accordance with Claim 1 wherein said means for rotating and translating comprises at least one fixed gear and at least one rotatable gear.

15 12. A system in accordance with Claim 1 wherein said means for rotating and translating comprises:

a) a mounting plate;

20 b) a gear train including a first gear disposable adjacent said windshield, a second gear meshed with said first gear, and a third gear meshed with said second gear, said first, second, and third gears having first, second, and third axes, respectively, included in a straight line including a virtual pivot point, said first gear being non-rotationally attached to said mounting plate;

c) a first non-linear track formed in said mounting plate;

25 d) a motor having a stator and a rotor, said stator being slidable in said first track, and said rotor being supportive of said second gear; and

e) a wiper arm fixedly attached at an inner end thereof to said third gear,

wherein rotation of said second gear by said motor causes an outer end of said wiper arm to be drawn in a linear path across said windshield.

5 13. A system in accordance with Claim 12 further comprising a second track formed in said mounting plate for guiding said third gear in motion about said virtual pivot point.

10 14. A system in accordance with Claim 13 further comprising:

- a) an attitude arm having inner and outer ends;
- b) a first tab extending between said inner end of said wiper arm and said inner end of said attitude arm; and
- 15 c) a second tab extending between said outer end of said wiper arm and an outer end of said attitude arm, defining a parallelogram arrangement thereamong, said wiper blade assembly being fixedly attached to said second tab.

20 15. A system in accordance with Claim 12 wherein the angle subtended by said first gear is one-half the angle subtended by said third gear.

25 16. A system in accordance with Claim 12 wherein the radius of said third gear is one-half the radius of said first gear.

17. A system in accordance with Claim 12 wherein said system has a nominal sweep angle between sweep extremes of about

120 degrees.

18. A system in accordance with Claim 13 wherein said first and second tracks are circular and concentric upon said virtual pivot point.

19. A system in accordance with Claim 13 wherein at least one of said first and third gears is a non-circular gear defining a cam gear and wherein said first and second tracks are non-circular.

20. A vehicle comprising a windshield and a windshield wiping system, said system including
a wiper arm assembly,
a wiper blade assembly operationally attached to said wiper arm assembly, and
means for ~~rotating~~ and translating said wiper arm assembly to cause said wiper blade assembly to track in a linear path across said windshield.

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